

Sipping Snow in the Sierra

When most people think of water, they don't usually think of snow. But snow is frozen water, and some of your drinking water may come from mountain snow.

Snow is made up of tiny, frozen water crystals and air. When snow melts, the water flows downhill and accumulates in streams, rivers, and underground **aquifers**. Some of this snowmelt ends up in **reservoirs**, where it is stored for people to use.

In the western United States, nearly 75 percent of the freshwater supply comes from snowmelt stored in reservoirs. A reservoir is like a bank account or piggy bank. Water is taken out of the bank in the summer and fall, and nature fills it back up in the winter and spring.

In recent years, a problem has developed: nature has been dropping less snow and rain on some mountain ranges in the West due to climate change. This means there is less snowmelt to fill the aquifers and reservoirs for use in the dry seasons.



Vocabulary



aquifer — Underground layer of rock, sand, or gravel that can hold water.

reservoir — A freshwater lake that stores a large supply of water.

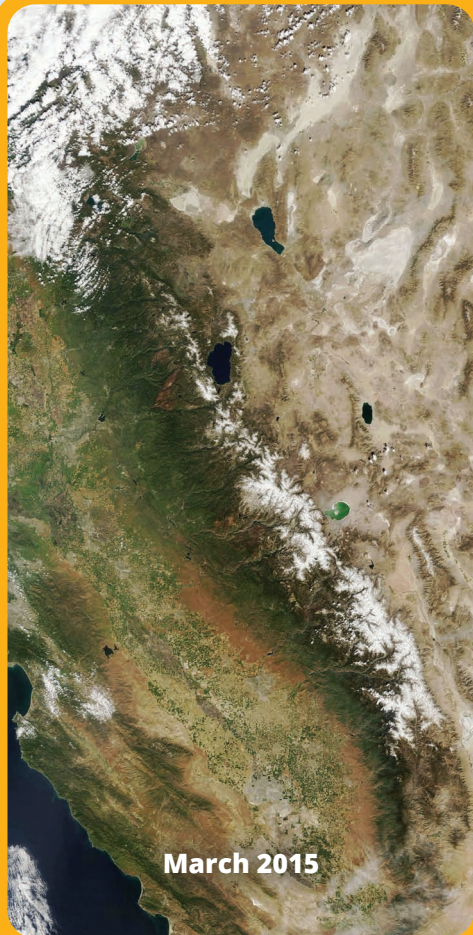
Trinity Lake is a reservoir in Northern California that is fed by snowmelt from the mountains.

Snow in the Sierra

2015 was a warm and dry winter in California. The lack of snow and rain caused California to restrict the amount of water people could use in the summer of 2015. Some farms in southern California had to use water from Lake Mead (in Nevada) to make up for the lack of water in their reservoirs.

The winters between 2016-2019 were better, with more snow and rain in the Sierra Nevada. But 2020-21 was quite dry, and long-term drought and climate change means there is less snowy water in California's mountains than in the past.

These satellite images show the Sierra Nevada in March 2015, 2017, and 2020. Notice how the white snow covers more of the mountains in 2017 than in 2015. 2017 was a wet and snowy winter compared to 2015, which was very dry. It may look like 2020 was a snowy year; however, snowfall in 2020 was only 37 percent of the average. Snow may have covered more area, reaching areas lower in elevation, but snow depth in 2020 was far less than in 2017.



March 2015



March 2017



March 2020



Wildlife and Water

People are not the only ones who depend on water. The Sierra Nevada is home to black bears. Recent droughts have diminished the animals' natural food sources, such as acorns and berries. Bears have been forced to travel elsewhere to find food and water, sometimes into cities.

DIY Science

Snowmelt Science

When snow melts, it turns into water. Snow in the Sierra Nevada becomes the water that people drink when it melts and fills reservoirs and aquifers. But how much water does snow produce?

Instructions:

1. Collect snow.
If there is no snow is available, crush ice with a blender (A) or hammer (B) to make snow.
2. Scoop your snow into the cup until it is $\frac{3}{4}$ full.
3. Measure and mark the top of the snow level with a marker. Then mark where you think the water level will be once the snow melts.
4. Wait for the snow to melt.
5. Compare the water level with where you thought the water level would be.

Materials:

- ice cubes or snow
- clear plastic cup
- blender or plastic bag and hammer
- marker



With help from an adult, crush ice in a plastic bag with a hammer to make snow.

How to Make Snow Option B



Finely crush ice in a blender to make the snow sample.

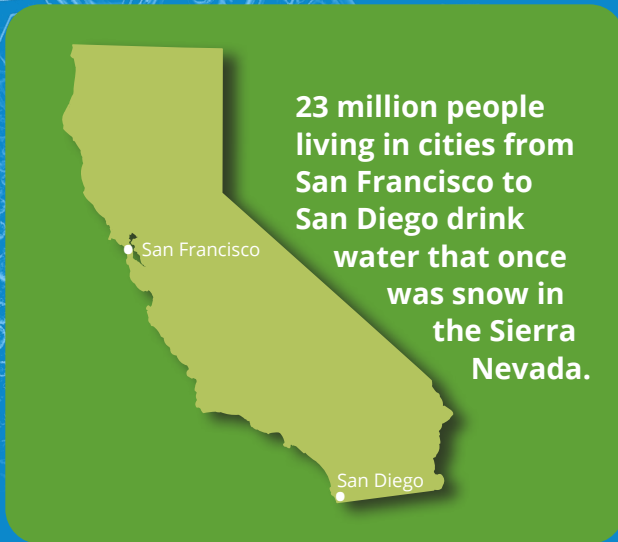
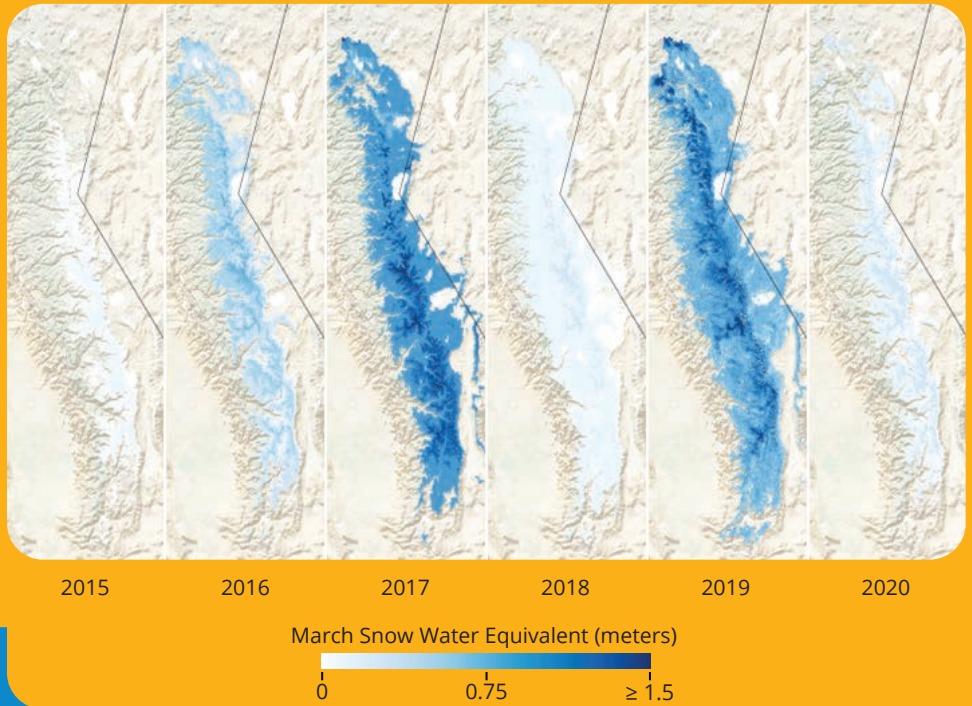
How to Make Snow Option A

Questions:

How close were you? Did the water take up more, less, or the same amount of space as the snow? If more or less, how much more or less? Why do you think this happened?

Snow water equivalent is the measure of how much water is produced by melted snow. Between 2015 and 2020 there were big differences in the amount of snow water that fell on the Sierras.

2015 was the lowest snow year on record. 2016 was an average year and 2017 was one of the snowiest. Even with all the snow from 2017, the three years following produced variable amounts of snow. The large amount in 2019 was not enough to make up for the lack of snow in 2018 and 2020.



You Do the Math!

In December 2015, an average of 45.7 cm (18 inches) of snow covered the Sierra Nevada.

If 25.4 cm (10 inches) of snow makes 2.54 cm (1 inch) of water on average, how many centimeters (or inches) of water did 45.7 cm (18 inches) of snow make?

Aside: Wetter snow, such as sleet, will produce more water than drier snow.

45.7 cm (or 18 inches) x
2.54 cm (or 1 inch) ÷
25.4 cm (or 10 inches) =
4.57 cm (or 1.8 inches) of water

You Do the Math:

space than snow.

Snow is made up of frozen water crystals and air. When snow melts, the air escapes and the water molecules take up the space where the air used to be. Therefore, water takes up less

Why do you think this happened?

Snowmelt Science:

Answers



Were you right? Why? How many inches of water did your snow make?